

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:  
an image bearing member on a surface of which an electrostatic latent image is formed;  
5 developing means which contains a developer and which has: a rotatable developer carrying member, which abuts against the surface of the image bearing member; and storage means storing information on image formation history, said developing means being adapted  
10 to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image;  
a contact/separation mechanism which enables the  
15 developer carrying member to abut against and separate from the surface of the image bearing member; and control means which, in a preparation process before image formation of second and subsequent times using the developing means, finds a lapsed time from a  
20 finish time of image formation of the last time until a start time of image formation of this time based upon the information on image formation history stored in the storage means and, in a state in which the image bearing member and the developer carrying member are  
25 separated from each other by the contact/separation mechanism, operates the developer carrying member for a predetermined period of time according to the lapsed

time.

2. An image forming apparatus according to claim  
1, further comprising developer remaining amount  
5 detection means which detects an amount of developer  
remaining in the developing means,

wherein, in the preparation process before image  
formation of the second and subsequent times using the  
developing means, in the state in which the image  
10 bearing member and the developer carrying member are  
separated from each other, the control means operates  
the developer carrying member for the predetermined  
period of time according to the lapsed time and  
information on the developer remaining amount detected  
15 by the developer remaining amount detection means.

3. An image forming apparatus according to claim  
1, further comprising environment detection means which  
detects an environmental state of an apparatus main  
20 body,

wherein, in the preparation process before image  
formation of the second and subsequent times using the  
developing means, in the state in which the image  
bearing member and the developer carrying member are  
25 separated from each other, the control means operates  
the developer carrying member for the predetermined  
period of time according to the lapsed time and

information on the environmental state detected by the environment detection means.

4. An image forming apparatus according to claim  
5 1,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

10 5. An image forming apparatus according to claim  
1,

wherein the preparation process before image formation is a preparation process before the developer carrying member carries the developer to the  
15 electrostatic latent image.

6. An image forming apparatus according to claim  
1,

wherein the developer is a mono-component  
20 nonmagnetic toner.

7. An image forming apparatus according to claim  
1,

wherein the developer has a shape factor SF1 of  
25 100 to 160 and a shape factor SF2 of 100 to 140.

8. An image forming apparatus according to claim

1,

wherein the developing means is a development cartridge which is detachably attachable to the image forming apparatus.

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9. A control method for an image forming apparatus for controlling an image forming operation in an image forming apparatus including: an image bearing member; developing means which contains a developer and  
10 which has a rotatable developer carrying member, which abuts against the image bearing member, and storage means storing information on image formation history, the developing means being adapted to form an image on the image bearing member as the developer carrying  
15 member carries the developer to the image bearing member; a contact/separation mechanism which enables the developer carrying member to abut against and separate from the surface of the image bearing member; and reading/writing means which accesses the storage means, the control method comprising:  
reading the information on image formation history stored in the storage means with the reading/writing means before image formation of a second and subsequent times using the developing means;  
20 finding a lapsed time from a finish time of image formation of the last time until a start time of image formation of this time based upon the information on  
25

image formation history; and

operating, in a state in which the image bearing member and the developer carrying member are separated from each other by the contact/separation mechanism,  
5 the developer carrying member for a predetermined period of time according to the lapsed time.

10. A control method for an image forming apparatus according to claim 9,

10 wherein the image forming apparatus further comprises developer remaining amount detection means which detects an amount of developer remaining in the developing means, the control method further comprising:

15 operating, in the state in which the image bearing member and the developer carrying member are separated from each other, the developer carrying member for the predetermined period of time according to the lapsed time and information on the developer remaining amount detected by the developer remaining amount detection means.  
20

11. A control method for an image forming apparatus according to claim 9,

25 wherein the image forming apparatus further comprises environment detection means which detects an environmental state of an apparatus main body, the

control method further comprising:

operating, in the state in which the image bearing member and the developer carrying member are separated from each other, the developer carrying  
5 member for the predetermined period of time according to the lapsed time and information on the environmental state detected by the environment detection means.

12. A control method for an image forming apparatus according to claim 9,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

15 13. An image forming apparatus, comprising:  
an image bearing member on a surface of which an electrostatic latent image is formed;  
developing means which contains a developer and which has: a rotatable developer carrying member, which  
20 abuts against the surface of the image bearing member; and storage means storing information on image formation history, said developing means being adapted to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image;  
25 a contact/separation mechanism which enables the

developer carrying member to abut against and separate from the surface of the image bearing member; and control means which, in a preparation process before image formation using the developing means,  
5 judges whether or not the developing means is in an unused state based upon existence of information on image formation history stored in the storage means and, in the case in which the developing means is recognized as being in the unused state, operates the developer  
10 carrying member for a predetermined period of time in a state in which the developer carrying member is separated from the surface of the image bearing member.

14. An image forming apparatus according to claim  
15 13,

wherein color information of the developer contained in the developing means is further stored in the storage means, and

in the preparation process before image formation  
20 using the developing means, in the case in which the developing means is recognized as being in the unused state, the control means controls an operation time of the developer carrying member according to the color information of the contained developer stored in the  
25 storage means.

15. An image forming apparatus according to claim

13, further comprising environment detection means which detects an environmental state of an apparatus main body,

wherein, in the preparation process before image  
5 formation using the developing means, in the case in  
which the developing means is recognized as being in  
the unused state, the control means controls an  
operation time of the developer carrying member  
according to the information on the environmental state  
10 detected by the environment detection means.

16. An image forming apparatus according to claim  
13,

wherein the operation of the developer carrying  
15 member for the predetermined period of time is an  
operation for giving a charge to the developer.

17. An image forming apparatus according to claim  
13,

20 wherein before image formation means at least  
before the developer carrying member carries the  
developer to the electrostatic latent image.

18. An image forming apparatus according to claim  
25 13,

wherein the developer is a mono-component  
nonmagnetic toner.

19. An image forming apparatus according to claim  
13,

wherein the developer has a shape factor SF1 of  
100 to 160 and a shape factor SF2 of 100 to 140.

5

20. An image forming apparatus according to claim  
13,

wherein the developing means is a development  
cartridge which is detachably attachable to the image  
10 forming apparatus.

21. A control method for an image forming  
apparatus including: an image bearing member;  
developing means which contains a developer and which  
15 has a rotatable developer carrying member, which abuts  
against the image bearing member, and storage means  
storing information on image formation history, the  
developing means being adapted to form an image on the  
image bearing member as the developer carrying member  
20 carries the developer to the image bearing member; a  
contact/separation mechanism which enables the  
developer carrying member to abut against and separate  
from the surface of the image bearing member; and  
reading/writing means which accesses the storage means,  
25 the control method comprising:

reading the information on image formation  
history stored in the storage means with the

reading/writing means before image formation using the developing means;

judging whether or not the developing means is in an unused state according to presence or absence of the  
5 information on image formation history; and

operating, in the case in which the developing means is judged to be in the unused state, the developer carrying member for a predetermined period of time in a state in which the developer carrying member  
10 is separated from the image bearing member.

22. A control method for an image forming apparatus according to claim 21,

wherein color information of the developer  
15 contained in the developing means is further stored in the storage means, the control method further comprising:

reading, in the case in which the developing means is judged to be in the unused state, the color  
20 information of the contained developer recorded in the storage means with the reading/writing means; and

operating the developer carrying member for the predetermined period of time according to the color information of the contained developer.

25

23. A control method for an image forming apparatus according to claim 21,

wherein the image forming apparatus further comprises environment detection means which detects an environmental state of an apparatus main body, the control method further comprising:

5 operating, in the case in which the developing means is judged to be in the unused state, the developer carrying member for the predetermined period of time according to information on the environmental state obtained by the environment detection means.

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24. A control method for an image forming apparatus according to claim 21,

wherein the operation of the developer carrying member for the predetermined period of time is an  
15 operation for giving a charge to the developer.

25. An image forming apparatus, comprising:

an image bearing member on a surface of which an electrostatic latent image is formed;

20 developing means which contains a developer and which has a rotatable developer carrying member, which abuts against the surface of the image bearing member, said developing means being adapted, in a state in which the developer carrying member is brought into  
25 contact with the image bearing member, to carry the developer from the developer carrying member to the electrostatic latent image to thereby visualize the

electrostatic latent image on the surface of the image bearing member;

a contact/separation mechanism which enables the developer carrying member to abut against and separate  
5 from the surface of the image bearing member; and

control means which, in a state in which the developer carrying member is separated from the surface of the image bearing member, operates the developer carrying member for a predetermined period of time  
10 based upon a state of the developing means.

26. An image forming apparatus according to claim

25,

wherein, in the case in which the developing  
15 means is in an unused state, the control means operates the developer carrying member for the predetermined period of time in the state in which the developer carrying member is separated from the surface of the image bearing member.

20

27. An image forming apparatus according to claim

25,

wherein, in the case in which the developing  
means is in an unused state, the control means operates  
25 the developer carrying member for the predetermined period of time in the state in which the developer carrying member is separated from the surface of the

image bearing member based upon color information of  
the developer.

28. An image forming apparatus according to claim  
5 25,

wherein, in the case in which the developing  
means is in an unused state, the control means operates  
the developer carrying member for the predetermined  
period of time in the state in which the developer  
10 carrying member is separated from the surface of the  
image bearing member based upon environmental  
information of an apparatus main body.

29. An image forming apparatus according to claim  
15 25,

wherein the operation of the developer carrying  
member for the predetermined period of time is an  
operation for giving a charge to the developer.

20 30. An image forming apparatus, comprising:  
an image bearing member on a surface of which an  
electrostatic latent image is formed;  
developing means which contains a developer and  
which has a rotatable developer carrying member, which  
25 abuts against the surface of the image bearing member,  
the developing means being adapted to visualize the  
electrostatic latent image on the surface of the image

bearing member as the developer carrying member carries the developer to the electrostatic latent image; and control means which operates the developer carrying member according to a lapsed time from a 5 finish time of image formation of the last time until a start time of image formation of this time.

31. An image forming apparatus according to claim 30,  
10 wherein, in a state in which the developer carrying member is separated from the surface of the image bearing member, the control means operates the developer carrying member for a predetermined period of time based upon the lapsed time and information on a 15 remaining amount of the developer in the developing means.

32. An image forming apparatus according to claim 30,  
20 wherein, in a state in which the developer carrying member is separated from the surface of the image bearing member, the control means operates the developer carrying member for a predetermined period of time based upon the lapsed time and environmental 25 information of an apparatus main body.

33. An image forming apparatus according to claim

31,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

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34. An image forming apparatus comprising:  
an image bearing member on a surface of which an electrostatic latent image is formed;  
developing means which contains a developer and  
10 which has: a rotatable developer carrying member, which abuts against the surface of the image bearing member; and a regulating member for giving charge to the developer on the developer carrying member and for regulating the developer, the developing means being  
15 adapted to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image; and  
a contact/separation mechanism which enables the  
20 developer carrying member to abut against and separate from the surface of the image bearing member; and  
control means which, in a state in which the developer carrying member is separated from the surface of the image bearing member, operates the developer  
25 carrying member for a predetermined period of time based upon a state of the developing means.

35. An image forming apparatus according to claim  
34,

wherein, in the case in which the developing  
means is in an unused state, the control means operates  
5 the developer carrying member for the predetermined  
period of time in the state in which the developer  
carrying member is separated from the surface of the  
image bearing member.

10 36. An image forming apparatus according to claim  
34,

wherein the control means operates the developer  
carrying member for the predetermined period of time in  
the state in which the developer carrying member is  
15 separated from the surface of the image bearing member  
according to a left unattended time of the developing  
means.

37. An image forming apparatus according to claim  
20 34,

wherein the operation of the developer carrying  
member for the predetermined period of time is an  
operation for giving a charge to the developer.